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BIRDS COLLECTED DURING THE WHITNEY SOUTH SEA EXPEDITION. XLI¹

NOTES ON NEW GUINEA BIRDS. VI²

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This paper brings to a conclusion my revisions of New Guinea Non-Passerine genera, treating certain genera of the

families Casuariidae, Ardeidae, Anatidae, and Accipitridae.

CASUARIIDAE

NOTES ON THE GENUS *CASUARIUS*

There is no genus of New Guinea birds about which there is so much uncertainty as *Casuarus*. There are two reasons for this: One is that a majority of the forms (14 of the 22 described by Lord Rothschild) were described from zoological garden specimens of unknown origin, and the second is the great individual variation of these birds which was not appreciated until recently.

No satisfactory revision of the genus can be undertaken without the specimens (and the colored plates) of the Rothschild collection which are now in the possession of the British Museum, but a study of the literature permits certain conclusions that might form a basis for the eventual revision. At any rate, most of our conclusions about forms of this genus must remain guesswork until more wild-killed specimens have been examined.

First of all, it is fairly clear now that the genus contains only three species: The small cassowaries without a wattle, *Casuarus bennetti*; secondly, the large cassowaries with one wattle, which are known only from north New Guinea, *Casuarus unappendiculatus*; and, finally, the casso-

waries with two wattles, *Casuarus casuarus*.

Much confusion is also caused by the fact that young cassowaries are the favorite pets of the New Guinea natives. I have seen them in almost every native village that I visited and they are carried around and traded very frequently. Only one species (*C. bennetti*) occurs on New Britain, as the Whitney Expedition has established beyond doubt, nevertheless a form of *unappendiculatus* (*multicolor*) was described from New Britain, unquestionably based on a captive bird brought across from New Guinea. It was a favorite theory of Lord Rothschild that the home of *C. hagenbecki* and *jamrachi* and other aberrant forms would eventually be discovered in the Admiralty Islands and other little-known islands of Melanesia. The Whitney South Sea Expedition has paid special attention to this problem, but the unanimous information received from natives was that no cassowary had ever occurred in the Admiralty Islands and that *C. bennetti bennetti* of New Britain is the only cassowary living on New Britain.

It is somewhat difficult to understand how a cassowary should have come across to Seran, Moluccas, without changing more from its New Guinea relatives than it has. I consider it distinctly possible that the

¹ Previous papers in this series comprise American Museum Novitates, Nos. 115, 124, 149, 322, 337, 350, 356, 364, 365, 370, 419, 469, 486, 488, 489, 502, 504, 516, 520, 522, 531, 590, 609, 628, 651, 665, 666, 709, 714, 820, 828, 912, 915, 933, 939, 947, 977, 986, 1006, and 1007.

² Submitted to the Editor on Jan. 13, 1939.

Seran cassowary, *C. casuarius*, is nothing but a descendant of captive cassowaries, probably imported from the Onin Peninsula in New Guinea. The close trade connections between the natives of Seran and of that part of New Guinea are well established.

The structural characters, such as the shape of the casque and of the wattles, are just as variable as the coloration. This is particularly well illustrated by D'Albertis' sketches of *Casuarius casuarius sclateri* (Mem. Acad. Sci. Torino, XXXIV (2), 1883, pp. 198-203). Extra wattles are known to have occurred as abnormalities, and such abnormal birds as *doggetti*, and particularly as *jamrachi* and *hagenbecki*, are nothing but aberrant types of one of the known species.

The plumage changes are also insufficiently known. The normal immature plumage is brown, but Lord Rothschild has described a cassowary with black plumage although it had all the other characters of immaturity (*C. chimaera*). On the other hand, Salvadori writes that the type of *C. tricarunculatus* had still its brown plumage after it had reached an age of more than two years (more likely more than three years) (Orn. Pap. Mol., III, p. 474). Equally, the type of *Casuarius casuarius bistratus* van Oort still had brown feathers although it was four years old (Notes Leyden Mus., XXIX, p. 204).

Casuarius bennetti

This species is so well defined that there was never any doubt about the specific relationship of any of its forms.

The species is characterized by the absence of wattles although there is sometimes a small caruncle on the foreneck. The casque is rather low and triangular, more or less flattened or even concave on its posterior part. The general size is small. This is the only species found in the mountains (recorded by Rand up to 2800 m.). It also occurs in the lowlands, though apparently never far from the foot of the mountains. This is the only species also found on New Britain.

The individual variation is very considerable. The names *hecki*, *foersteri*, and *keys-*

seri apply to one form (Huon Peninsula), and the names *picticollis* and *loriae* to another form (southeast New Guinea) (see Bull. Amer. Mus. Nat. Hist., LXXIII, p. 4).

The immature bird, particularly of the western races, has very little blue on the neck, which is replaced by yellowish red. The names *roseigularis* and *rogersi* were given to specimens of this age class.

The four races: *papuanus* (Vogelkop), *claudii* (Snow Mts.), *picticollis* (southeast New Guinea), and *hecki* (northeast New Guinea) are fairly well defined, and there is reason to believe that *goodfellowi* and *shawmayeri* are also valid races. However, there is no reliable information available on the races occurring between Geelvink Bay and Astrolabe Bay.

Casuarius casuarius

The greatest difficulty is presented by the question whether or not the two wattled cassowaries, *C. casuarius* and *bicarunculatus*, belong to one or to two species. Both agree in the shape of the casque, in the presence of two wattles and in other points, but they are supposed to occur together on the Aru Islands and in Geelvink Bay. As a matter of fact, all the adult specimens of *bicarunculatus*, including the type, are of unknown origin. The reason why Wammer and Kobror Islands, Aru Islands, are accepted as type locality is because Rosenberg collected on these islands two young cassowaries (one of them semi-adult but still in brown plumage) which are said to agree with *bicarunculatus*. Since no other species of birds breaks up into subspecies on the Aru Islands, it is assumed that *bicarunculatus* is a different species from *C. c. beccarii* of which a wild-killed specimen was collected on Wokan, Aru Islands. It was mere supposition by Lord Rothschild that *violicollis* and *intermedius* came from the Aru Islands.

The reason for not considering *bicarunculatus* and *casuarius* as two distinct species, is the fact that no collector has yet shot both species at the same locality and, furthermore, that *tricarunculatus* (*altijugus*, *salvadorii*), *intermedius*, and *chimaera* are about intermediate in their characters.

It can only be decided by the collecting of a series of adult birds on the west coast of Geelvink Bay whether the distance between the two wattles varies individually and to what extent. For the time being it seems justifiable to unite *bicarunculatus* with *casuarius* in one species.

It is rather doubtful that the home of *bicarunculatus* is really the Aru Islands. All the adult specimens are of unknown origin and the two young birds collected by Rosenberg on Wammer and Kobror show separated wattles, but they are apparently close together, not widely separated as in typical specimens of *bicarunculatus*. Salvadori (Orn. Pap. Mol., III, p. 477) ascribes this to their immaturity, but it is just as possible, or more so, that it is a character subject to geographical variation. The species *casuarius* undoubtedly occurs in the western part of the Vogelkop and probably on Salawati, but there are no wild-killed specimens known from these regions. The general trend of variation in this species (see below) and the fact that this westernmost part of Dutch New Guinea was more easily accessible than any other part of New Guinea during the period 1860 to 1880, when practically all the known specimens of *bicarunculatus* were imported, makes me believe that the true home of *bicarunculatus* is the western part of the Vogelkop.

C. c. sclateri and *bicarunculatus* are only the extremes of wattle structure of a connected series of forms. In *sclateri*, the two wattles are usually merged to a single wattle which is merely bifurcated at the tip (see Figs. 4-6, Mem. R. Acc. Sci. Torino, XXXIV (2), p. 201). In the type specimen of *beccarii* from Aru Islands, they seem to be similar, but in the two Aru birds collected by Rosenberg, they are distinctly separated. In *johnsonii* (= *australis*) of northern Queensland the two wattles are completely separated, but they touch each other throughout their entire length. *C. casuarius* is similar, but the separation of the two wattles is sometimes more distinct, particularly at the upper end. In *tricarunculatus* (= *salvadorii* = *altijugus*) the two wattles no longer touch each other, although it is still a big step from them to

bicarunculatus with the wattles moved to the sides of the neck. The status of *bicarunculatus* cannot be settled until adult specimens of this form have been collected in its true range.

Casuarius unappendiculatus

The species is rather well defined. It is known only from Salawati, Vogelkop, Japen, and north New Guinea from Geelvink Bay to Astrolabe Bay. The records from New Britain are unquestionably erroneous, caused by the transport of tame birds.

The principal characters of this species are certain skeletal characters as defined by Pycraft (Trans. Zool. Soc. London, XV, p. 275), its usually high but posteriorly broad casque, the presence of a single wattle on the foreneck, and usually a wart or wattle-like skinfold near the gape.

Casuarius unappendiculatus unappendiculatus

A good illustration of this form which occurs on Salawati and the western parts of the Vogelkop, was published by Salvadori (Pl. 2, fig. 6, Mem. R. Acc. Sci. Torina, XXXIV (2), 1883, p. 218). The plates published by Lord Rothschild¹ under this name (plates 29 and 30) are just color phases of *C. u. occipitalis*. There are several wild-killed specimens of this form known, but none showed any yellow on the hind-neck.

It is not known which form occurs at the foot of the Arfak Mts. and on the west coast of Geelvink Bay.

Casuarius kaupii is apparently based on an immature of this species, though it might belong to *papuanus*.

Casuarius unappendiculatus occipitalis Salvadori

Japen Island.—Apparently the only wild-killed specimens of this form are the type of *occipitalis*, and the type of *laglaizei* Oustalet. The latter is in all respects similar to *occipitalis* except that a good part of the yellow area on the neck is replaced by blue. The other extreme, where most

¹ 1900, Trans. Zool. Soc. London, XV, pp. 109-148, Pls. 22-41.

of the blue has been replaced by yellow, is illustrated by the plates 29 and 30 in Rothschild's monograph, on which Matschie's *rothschildi* is based. The range of this form is unknown, but includes in addition to Jobi probably most of the coast of Geelvink Bay.

Casuarus unappendiculatus aurantiacus
Rothschild

The type-plate (Pl. 32, *op. cit.*) shows a bird with the yellow reaching right up to the gape wattles. Later on the same individual became bluer and bluer and, at the time of its death, the entire foreneck was blue about as in the plate of *philipi* (Pl. 33, *op. cit.*). A color sketch of *aurantiacus* at the time of its death is preserved at the Berlin Museum (fide Matschie, J. f. O., XLIX (1901), p. 267). This shows clearly that age affects the coloration in a rather similar manner as in *C. bennetti* (see above). Light places turn darker with age. *C. laglaizei* is probably only an adult phase of *occipitalis*, and *rothschildi* is a still younger phase. As Matschie says, there is no reason to believe that *rufotinctus* is different from *aurantiacus*.

Only one question remains in regard to the eastern forms of the species, and that is: Is the yellow triangular spot on the hind-neck as variable as the rest of the colors or not? Significant is the fact that among two wild-killed specimens collected by the Sepik Expedition (1923, Arch. f. Naturg., LXXXIX, A, Heft 8, p. 92) there was one with a yellow spot on the

hind-neck, while the other had none. This indicates either that the yellow spot is subject to individual variation or that the ranges of two forms, one with the spot and one without it, meet on the Sepik. Although the former alternative seems to me the more probable one, I am adopting the second one for the time being, because it permits the segregation of the names of forms with and without the yellow spot.

Casuarus unappendiculatus aurantiacus
Rothschild, 1899

With *rufotinctus* Rothschild as synonym.

RANGE.—? From east coast of Geelvink Bay to the Sepik River.

Casuarus unappendiculatus philipi
Rothschild, 1898

With *suffusus* Rothschild, *mitratus* Rothschild, and *multicolor* Le Souef as synonyms.

RANGE.—? From the Sepik River to Astrolabe Bay and the upper Ramu River. Possibly this is only the adult stage of *aurantiacus*.

The name *doggetti* was applied to an immature with much yellow and two wattles, one above the other. The second wattle is undoubtedly an aberration and the notes given on the coloration do not permit a guess as to which subspecies the name might apply.

The names *jamrachi* and *hagenbecki* based on juveniles apply unquestionably to very aberrant specimens and do not need to concern us until adult, wild specimens have come to light.

ARDEIDAE

ON THE EASTERN RACES OF *BUTORIDES STRIATUS* (L.)

Hartert's conclusions (1920, Vög. pal. Fauna, II, pp. 1249-1251) on the eastern races of the little mangrove heron have been generally accepted, as, for example, by Peters in his "Checklist of Birds of the World" (I, pp. 106-107, 1931). He recognizes four subspecies east of the range of *javanicus* and treats *rogersi* of midwest Australia as a separate species. Recently Stresemann and Paludan (1932, Novit. Zool., XXXVIII, p. 181) included some birds from Waigeu and Numfor with

moluccarum, but Junge (1937, Nova Guinea (N.S.), I, p. 146) showed that they differed in the bill measurements from birds from the Moluccas, and he referred them to *macrorhynchus* Gould, as Hartert had done originally. In the meantime, the American Museum, through the efforts of the Whitney South Sea Expedition, had received large collections not only from the New Guinea area but particularly from the Solomon Islands and Polynesia.

A study of more than 150 specimens

from the range of the species east of its form *javanicus* leads me to the following conclusions.

Individual variation is not very pronounced and concerns mostly the amount of rufous wash on the gray of the under parts. Greasy birds have often the entire back glossy green, and in well-kept specimens the powder of the powder-downs makes these specimens rather gray green. Females are not only smaller than males but they also have the lanceolate feathers of the back shorter and they show more spotting on the throat.

Butorides rogersi Mathews is neither a good species nor a color phase of *stagnatilis*, as was also believed by some authors, but a well-marked geographical race of *striatus* occupying a range on the west coast of Australia, south of that of *stagnatilis*. The latter form, which is restricted to northwest Australia and Northern Territory, is also very distinct through its pale gray color. These two forms, as well as the birds occurring on Flores and Timor, shall be treated in more detail in a forthcoming paper.

The remaining forms can be arranged as follows.

Butorides striatus macrorhynchus (Gould), 1848

A large form with the wing of adults generally above 200 mm.; dark, with a not very pronounced brownish wash; white on center of throat much reduced; longitudinal streaking in middle of throat rather vague. Wing, adults 200, 201, 206, immatures 188, 199, 205, 206; culmen, adults 68, 69, 73, immatures 65, 66, 68, 70.

RANGE.—New South Wales and probably southern Queensland.

***Butorides striatus littleri* Mathews, 1912**

Smaller than *macrorhynchus* and decidedly more rufous brown below and on the hind-neck; the back has a bronze gloss rather than a greenish one; the general coloration is dark, with more white on the middle of the throat and with the streaking more pronounced. The much more rufous coloration of north Queensland birds as compared with the New South Wales series is shown as clearly in the immature plumage as in the adult.

Wing, 3 ♀ ad. (one sexed as ♂) 184, 189, 190; culmen, ♀ ad. 68, 69, 71, ♂ imm. 66.

RANGE.—Cooktown, northern Queensland.

The material of this form, before me, is not very satisfactory since it does not contain an adult male.

Cape York birds are slightly different from Cooktown birds; they are smaller (wing, ♂ ad. 183, ♀ ad. 174; culmen, ♂ ad. 69, ♀ ad. 65), paler rufous underneath and on the edges of the upper wing-coverts and more grayish.

Birds from south and southeast New Guinea are apparently most similar to Cape York birds, but still paler and more grayish, with less spotting on the throat and with smaller bills.

The present material does not justify any further subdivision.

Butorides striatus moluccarum Hartert, 1920

Small, with a short bill; rather pale, but with a generous rufous wash; hind-neck grayish; throat light with indistinct brownish streaks; edges of upper wing-coverts broad and rather pale ochraceous.

Females are darker, more strongly washed with rufous brown, more distinctly spotted on the throat and with darker edges to the upper wing-coverts.

Wing, ♂ ad. 177, 179, 180, 181, ♀ ad. 175, 177, 181; culmen, ♂ ad. 59, 60, 63, 63, ♀ ad. 57, 59, 62.

Until more material is available, the following populations will best be included with *moluccarum*. They probably comprise two or three distinct races:

Aru Islands.—Two adult males are very large (wing, 193, 193; culmen, 65, 68). They are darker than *moluccarum* with a stronger rufous wash; the tawny edges of the upper wing-coverts are narrower; the dark brown streaks along the center of the throat are more pronounced. They are fairly similar to *littleri*.

Obi.—A single specimen is moulting from the immature to the (sub) adult plumage (wing, 182; culmen, 61). It seems to be very dark and rufous.

Kei Islands.—The general size (wing, 178, 185, 189; culmen, 61, 61, 62) is slightly larger than in typical *moluccarum*. Two adults (from Tual) are paler and more grayish, one adult (from Add) is darker and

more rufous brown than the series of typical *moluccarum*.

***Butorides striatus papuensis*,
new subspecies**

TYPE.—No. 301210, Amer. Mus. Nat. Hist.; ♂ ad.; Numfor Island, Geelvink Bay; April 28, 1931; Georg Stein coll.

In coloration quite similar to *moluccarum*, but darker, particularly underneath, more strongly washed with rufous brown, the upper throat purer white, with the streaking almost obsolete; size averaging larger; wing, 183, 184, 185, 187, 188 (against 175–181); culmen, 58, 63, 65, 68 (against 57–63).

RANGE.—Known only from Waigeu, Numfor, Japen, and the coast of Geelvink Bay. For additional measurements see Junge (1937, Nova Guinea, (N.S.) I, p. 146) under the name *macrorhynchus*.

***Butorides striatus solomonensis*,
new subspecies**

TYPE.—No. 224640, Amer. Mus. Nat. Hist.; ♂ ad.; Vangunu Island; August 1, 1928; Whitney South Sea Expedition (Hamlin coll.).

Similar to *papuensis*, but darker, grayer and with conspicuous streaking of the throat; the hind-neck shows the more grayish coloration particularly well; the size is larger.

Males with particularly strongly spotted throat average smaller although having all the other characteristics of adults; they are listed as subadults in the following tabulation: Wing ♂ ad. 193, 193, 193, 194, 194, 195, 195, 196, 198, 198, 200; ♂ subad. 185, 188, 189, 189, 191, 194; ♀ ad. 180, 186, 186, 186, 187, 187, 188, 189, 192, 194; ♂, ♀ immatures, 185–193; culmen, ♂ ad. 67, 68, 68, 69, 69, 70, 71, 71, 71, 74; ♂ subad. 68, 69, 69, 70, 70, 71; ♀ ad. 63, 64, 65, 66, 67, 68, 69, 69, 70; ♂, ♀ immatures, 64–68.

Differs from *littleri* by the much less rufous coloration, and from *macrorhynchus* by the smaller size, by the white throat with conspicuous spotting and by the broader ochraceous edgings to the wing-coverts.

RANGE.—Solomon Islands (Bougainville, Shortland, Fauro, Choiseul, Ysabel, Tulagi, Florida, Savo, Vella Lavella, Kulambangra, New Georgia, Narovo, Tetipari, Vangunu, Tiara, Molakobi, Malaita, Guadalcanar, San Cristobal and Gower).

It is curious that the species is absent from the Bismarck Archipelago as a breeding bird.

***Butorides striatus diminutus*,
new subspecies**

TYPE.—No. 215465, Amer. Mus. Nat. Hist.; ♂ ad.; Lomlom Island, Reef Islands; October 7, 1926; Whitney South Sea Expedition (R. H. Beck).

Similar to *B. str. solomonensis*, but much smaller; flanks and abdomen paler and more grayish; hind-neck also more grayish; streaking in center of throat less pronounced.

Wing, ♂ ad. 182, 183, 183, 184, 185 (183.4) [against 193–200 (195.4) in *solomonensis*]; ♀ ad., 179, 181, 181, 182, 182, 183, 184, 186, 188, (182.9) [against 186–194 (187.5)]; culmen, ♂ ad. 65, 65, 65, 65, 67 (65.4) [against 67–74 (69.8) in *solomonensis*]; ♀ ad., 61, 63, 63, 65, 65, 65, 66, 66, 67 (64.6) [against 63–70 (66.8)].

RANGE.—Nepan Island, Swallow group; Lomlom Island, Reef group; Utupua and Santa Cruz Islands, Santa Cruz group; Hiu Island, Torres group; Santo, New Hebrides (subsp.); Fiji Is. (subsp.).

Freshly moulted birds are more brownish, worn birds more grayish. A single adult female from Santo, New Hebrides (wing, 183; culmen, 66), agrees in measurements and coloration fairly well with *diminutus*. I have not examined any material from the southern New Hebrides or New Caledonia. Birds from there will probably be larger than *diminutus*.

Birds from the Fiji Islands agree with *diminutus* fairly well in coloration, but are intermediate in size between *diminutus* and *solomonensis*. They are best referred to *diminutus*.

Wing, ♂ ad. 184, 189, 193, ♀ ad. 185, 187, 188, 191; culmen, ♂ ad. 65, 66, 68, ♀ ad. 62, 64, 67.

Specimens examined from Viti Levu, Ngau, Kandavu and Vanua Mbalavu, Fiji Islands.

The species is unknown from the eastern Fiji Islands, Tonga Islands, Samoa Islands, or Cook Islands. It turns up again in the Society Islands in eastern Polynesia after a wide break in its range. The Society Islands form (*patruelis*) is very distinct.

***Butorides striatus patruelis* Peale, 1848**

Curiously similar to the widely separated *papuensis*, but still deeper rufous brown on the breast and with more white on the throat;

¹ Once 180.

the average size is smaller, but the bill averages longer. Differs from *solomonensis* and *diminutus* by the absence of blackish spots in the middle of the throat.

Wing, ♂ ad., 178, 180, 180, 181, 182, 183, 185; ♀ ad. 175, 176, 182; culmen, ♂ ad. 63, 64, 65, 65, 67, 67, 69; ♀ ad. 62, 63, 63.

RANGE.—Tahiti, Society Islands.

ANATIDAE

Nyroca australis extima, new subspecies

TYPE.—No. 215487, Amer. Mus. Nat. Hist.; ♂ ad.; Gaua, Banks Islands; November 19, 1926; Whitney South Sea Expedition (J. G. Correia).

Similar to *Nyroca australis australis* Eyton but smaller in all measurements.

Wing, ♂ ad. 193, 194, 198, 204, 208, 211; ♀ ad. 189, 193, 195, 196, 196; culmen, ♂ ad. 42, 42, 43, 43, 44, 45; ♀ ad. 41, 42, 42, 43, 45 [against wing, ♂ ad., 211–227 (218.0); culmen, ♂ ad., 43–48 (45.9) in typical *australis* from eastern and southern Australia].

There is so much individual variation of coloration in both the Australian and the Gaua Island series that it is difficult to determine the actual differences of coloration. Gaua birds are apparently more blackish brown on head and throat, but one of the six males is as rufous chestnut as any Australian bird.

RANGE.—Gaua Island, Banks Islands.

In addition to the series of adults, I have examined 3 ducklings which were collected on November 19.

Specimens from New Caledonia and from the New Hebrides (Santo) (see Sarasin, 1914, Nova Caledonia, I, p. 75) are also likely to belong to this race.

Birds from western Australia, Northern Territory, and northern Queensland average smaller than birds from eastern and southern Australia. Wing, ♂ ad. 208, 214, 215, 216, 217, 217, 221, 222 (av.

216.3); ♀ ad., 203, 208, 208, 209, 212; culmen, ♂ ad. 44, 44, 45, 45, 45, 46, 47, 47, 49, 49; ♀ ad. 42, 42, 43, 43, 44, 45, but the difference is decidedly too small, to justify the recognition of *fitzroyi* Mathews. I can see no constant differences of coloration between birds from western and eastern Australia.

Three females which were collected by Bruijn's hunters, supposedly on Waigau and in the Arfak Mountains, but which probably came from one of the lakes of the western Vogelkop, measure: wing, 203 + x, 212, 213; culmen, 41, 41, 42. Except for their rather small bills they seem to agree quite well with Australian birds.

A single male from Celebes (Ranoe Lindoe, March 26, 1917, H. Raven coll.) which I was able to examine (thanks to the kindness of the authorities of the U. S. Nat. Museum, Washington), agrees well with Australian birds. It measures: wing, 216, culmen, 44.

The species was recently discovered in eastern Java and a new race, *Nyroca australis ledeboeri*, was described by M. Bartels, Jr., and P. F. Franck (1938, Treubia, XVI, p. 337). Some of our Australian birds agree quite well with the description and the plate of the type, and I am somewhat doubtful as to the validity of this new race.

ACCIPITRIDAE

THE RACES OF *AVICEDA SUBCRISTATA* IN THE NEW GUINEA REGION

Since Stresemann's revision of this species (1913, Novit. Zool., XX, pp. 305–308) a very valuable discussion on this species was published by Siebers [1930, Treubia, VII (suppl.), Fauna Buruana, pp. 107–113]. He shows that females have certain color characters (more brownish bars across the under parts, brownish not blue-gray upper tail-coverts, etc.) which make it possible to determine ac-

curately the sex of almost every specimen. My own material fully confirms his conclusions. The measurements of females average larger than those of the males, but there is more overlap than was realized by Stresemann (*loc. cit.*).

Siebers' findings concerning geographical variation have also been fully confirmed by my material. It is evident that the name *reinwardtii*, under which New Guinea

birds have been listed by all recent authors, must be restricted to the birds of the islands Ambon and Seran, southern Moluccas and the name *stenozone* be used instead, which was originally given to some specimens from the Aru Islands.

Aviceda subcristata stenozone

(G. R. Gray)

Baza stenozone G. R. GRAY, 1858, Proc. Zool. Soc. London, pp. 169, 189.—Aru Islands.

Similar to *A. s. reinwardtii*, but greater under wing-coverts unbarred; hind-neck and upper back darker gray; under tail-coverts paler ochraceous; second black bar on tail averages broader and farther distant from base of tail; bars narrower in western New Guinea specimens.

Wing, ♂ adult, 293 (Aru), 290 (Salawati), 300 (Misol), 294, 298, 302 (western New Guinea), 295, 303 (Setekwa River).

♀ adult, 305 (Salawati), 308, 314 (Kapaur), 296, 306 (Setekwa River).

RANGE.—Aru Islands, Misol, Salawati, western New Guinea, eastward in the north to Geelvink Bay, in the south at least to the Fly River (D'Albertis coll.).

My material fully confirms the differences pointed out by Siebers [Treubia, VII (suppl.), Fauna Buruana, p. 113], which necessitates the recognition of *stenozone*.

***Aviceda subcristata waigeuensis*,**

new subspecies

TYPE.—No. 531672, Amer. Mus. Nat. Hist. (Rothschild Collection); ♀ ad.; Waigeu, Dec. 26, 1902; Waterstradt coll.

Similar to *stenozone* of western New Guinea but larger (wing, ♀ ad. 314–319, against 296–314); bars of under parts bright rufous brown, not blackish brown; gray of throat mixed with rufous; greater under wing-coverts also unbarred.

RANGE.—Waigeu Island.

Two immature birds ("♂" 308, "♀" 306) also have the bars much more rufous

than a series of immature *stenozone*. The peculiar characters of Waigeu birds have already been mentioned by Stresemann (1913, Novit. Zool., XX, p. 307), but with the much clearer understanding of the characters of *reinwardtii* and *stenozone*, it is no longer possible to unite them with either of these races. *A. s. waigeuensis* is intermediate between *rufa* and *stenozone*.

***Aviceda subcristata megala* (Stresemann)**

Baza subcristata megala STRESEMANN, 1913, Novit. Zool., XX, p. 307.—Fergusson Island, D'Entrecasteaux Archipelago.

In coloration like *stenozone*, males possibly with more deeply colored under tail-coverts; size much larger.

Wing, ♂ ad., 301, 308, 311, 316 (D'Entrecasteaux Archipelago), 298, 301, 311, 313 (southeastern New Guinea); ♀ ad., 314, 324, 334 (D'E.), 319, 319, 320, 326, 332 (southeastern New Guinea), [against ♂ 290–303 (296.9) and ♀ 296–314 (305.8) in *stenozone*].

RANGE.—Fergusson and Goodenough Islands, D'Entrecasteaux Archipelago, and southeastern New Guinea, westward in the north at least to the Kumusi River and probably as far as the Mamberano River, in the south to the Port Moresby district (Kubuna and Redscar Bay); Japen Island.

The receipt of material additional to that available to Stresemann in his original description shows that there is no significant difference of size between birds of southeastern New Guinea and the D'Entrecasteaux Archipelago.

I have not seen any north New Guinea material, but the figures quoted by Stresemann (1923, Arch. f. Naturgesch., LXXIX, A, Heft 8, p. 63) indicate that Sepik birds are intermediate between *stenozone* and *megala* but closer to *megala*. A male from Japen belongs clearly to *megala* (wing 312+).

THE VARIATION OF *HENICOPERNIS LONGICAUDA*

In 1932 Stresemann and Paludan described a new race of this species from Japen Island under the name *fraterculus* (Novit. Zool., XXXVIII, p. 239) as differing from typical *longicauda* by smaller size: wing, ♂ ad., 382 [against ♂ ad., 419; ♀ ad., 419–438].

In the New Guinea material before me

(16 adult birds) there is definite evidence of altitudinal variation. Most of the specimens have no indication of the altitude on the labels, but in most cases it is easy from the locality to tell whether the specimen was collected in the mountains or in the lowlands. In doubtful specimens a query is added to the wing measurement.

Lowland birds: wing length, ♂, 404 (?), 412; ♀, 405, 408 (?), 414; unsexed, 391 (Holnicote Bay).

Mountain birds: wing length, ♂, 418, 423, 428 (?); ♀, 418, 423, 425, 435; unsexed, 432 (?), 439.

The lowland birds 391-414 are distinctly smaller than the mountain birds 418-439.

It is possible that *fraterculus* (wing, 382) will fall within the range of lowland birds, as more of the latter are measured. The measurements recently published by Junge (1937, Nova Guinea, N.S., 1, p. 149) wing, ♂ ad. 380+, 383+, are strongly indicative of this.

ON THE VARIATION OF *ACCIPITER NOVAEHOLLANDIAE* IN THE NEW GUINEA REGION

Curiously enough no subdivision of *etorques* (= *leucosomus*) has ever been undertaken, and the birds from the enormous range from Waigeu, Aru Islands, islands of Geelvink Bay (except Biak), New Guinea, D'Entrecasteaux Archipelago, Woodlark group, and Louisiades were all combined in one subspecies.

Such an extensive range would be very extraordinary in a variable species such as *novaeollandiae* which has six races in the Moluccas and five races in the Solomon Islands. As a matter of fact, there are at least three races in the area given above as the range of *leucosomus*, and possibly two or three more. They differ in size, coloration, and the presence or absence of the white phase. Although I have seen 96 specimens, this material is sufficient only for a preliminary revision. In time, further revision will be necessary, particularly in regard to the birds from the islands of Geelvink Bay, the western and eastern Papuan Islands, and the Aru Islands.

The differences between the species *novaeollandiae* and *fasciatus* have been tabulated by Stresemann (1925, Journ. f. Ornith., LXXIII, p. 322).

I am grateful to Dr. Stresemann, Dr. Junge, and Mr. de Schauensee for the loan of valuable specimens from the collections of the Berlin Museum, Leiden Museum, and the Philadelphia Academy.

Accipiter novaehollandiae leucosomus (Sharpe)

Astur leucosomus SHARPE, 1874, Cat. Birds Brit. Mus., I, p. 119.—Lobo, Triton Bay (based on a specimen collected by S. Müller and figured and described by Schlegel, 1866, Vog. Nederl. Indie, p. 58, Pl. xi, fig. 3).

Urospizias etorques SALVADORI, 1875, Ann.

Mus. Civ. Genova, VII, p. 901.—Western New Guinea (Sorong, Dorei, Andai, Mansinam, and Hatam) and Salawati; hereby restricted to Dorei Harbor (= Manokwari).

Astur novaeguineae MADARÁSZ, 1899, Ornith. Monatsber., VII, p. 27.—Stephansort, Astrolabe Bay. [Pl. 16, Term. Füzetek, XXII (1899)].

ADULT MALE.—Generally without bars below, although the greater under wing-coverts are always barred; gray wash on upper throat variable; absent in some birds, and quite pronounced in others, sometimes from the same locality; the vinaceous rufous of the under parts turns rather ochraceous with wear; rufous nuchal collar generally absent, but slightly indicated in a possibly not fully adult bird from Japan, which is also conspicuously barred underneath.

ADULT FEMALE.—Like the male but larger; less gray on throat; barring of under parts more pronounced. Females from the west tend possibly more toward barring of the under parts. Specimens from Waigeu, Napan, and Japan are strongly barred, one from Numfor is not; of eight birds from northern and eastern New Guinea, three are distinctly barred. Two females from Japan, as well as one of two males, seem to be in a somewhat retarded adult plumage.

IMMATURE.—There are two types of immature plumage. A "white" and a "rufous" one. The "white" phase has the under parts white or buffy, with a regular and bold blackish brown pattern of spots and bars; under wing-coverts and axillaries whitish buff or slightly rufous; under tail-coverts and feathers of the thighs whitish or pale vinaceous; upper parts brown. The "rufous" phase has the entire under parts washed with rufous; under wing and thigh deep rufous, as in adults; blackish brown bars of throat and breast reduced and rather vague; upper parts brown. Some specimens are in a somewhat intermediate phase.

The explanation of the two "phases" is rather difficult. Both are genuine immature plumages as is certain from the shape of the tail-feathers and the coloration of the upper parts. One of the "white" birds is molting into the "*etorques*" garb,

and it is therefore unlikely that the "white" phase is the immature plumage of the *leucosomus* phase, and the "rufous" phase that of the *etorques* plumage.

The distribution of the two phases on New Guinea is uneven (w = white, i = intermediate, r = rufous). Among 18 immature females, I found: Waigeu 2 w; Vogelkop 1 w, 3 r; south New Guinea 3 r; Numfor 1 i; Japen 2 w, 2 i; north and east New Guinea 4 r. It seems that the "white" phase is restricted to western New Guinea and the islands.

There is a possibility that birds of northern and eastern New Guinea ("*novae-guineae*") can be separated from birds from western New Guinea, if more material is examined. It might, therefore, be convenient to keep the eastern and western population separated in the following discussion:

WESTERN POPULATION

White phase.—Common. There are in the A. M. N. H. material: normal phase 2 ♂ ad., 4 ♀ ad.; white phase 2 ♂ ad., 5 ♀ ad. White birds average smaller than normally colored specimens.

Wing, ♂ ad., 206 (w¹), 211, 213 (w), 214, 219; ♂ imm., 212, 213; ♀ ad., 239 (w), 241 (w), 244 (w), 245 (w), 246, 247; ♀ imm., 234, 235, 236, 238, 241, 243, 243, 244, 244, 244, 246.

RANGE.—Salawati, Waigeu, western New Guinea to the head of Geelvink Bay, Numfor and Japen Islands, Aru Islands (subsp.).

EASTERN POPULATION

White phase.—Common. There are in the A. M. N. H. material: normal phase 8 ♂ ad., 7 ♀ ad.; white phase 4 ♂ ad., 4 ♀ ad.; melanistic phase 1 ♀ ad. [See Journ. f. Ornith., LXXIII (1925), p. 321.]

Wing, ♂ ad., 208, 210, 212, 212, 213, 214 (w), 214, 215 (w), 216, 217, 220, 220 (w), 225, 225 (w); ♂ imm., 217; ♀ ad., 247, 248 (w), 248 (w), 250 (w), 252 (w), 253, 253, 255, 256, 263, 268; ♀ imm., 242, 247, 249, 252, 253, 253, 253, 255, 258.

RANGE.—Northern and eastern New Guinea, westward in the north at least to Takar, in the south to the Noord River.

A single adult female from the Aru Islands (Kühn coll.) is rather different from a series of mainland *leucosomus*. Its

principal measurements are: wing, 247, tail, 185, tarsus, 71. The bird is heavily barred underneath, the general coloration is pale. The bird is surprisingly similar to one of the known females of the D'Entrecasteaux Island form (see p. 10), but less suffused with gray on throat, sides of the neck, and breast. More material will unquestionably show that the Aru Islands have a distinct race, but it would be hazardous to describe from a single specimen, particularly in view of the enormous individual variation of *pallidimas*. This bird has already been referred to by Rothschild and Hartert (1915, Novit. Zool., XXII, p. 54).

Accipiter novaehollandiae pallidimas, new subspecies

TYPE.—No. 532846, Amer. Mus. Nat. Hist. (Rothschild Collection); ♂ ad.; Fergusson Island, D'Entrecasteaux Archipelago; December 11, 1894; Albert S. Meek.

Differs from *leucosomus* by larger size, the pale coloration of the male, and by the apparent absence of the white phase.

ADULT MALE.—Under parts pale vinaceous with regular white bars; under tail-coverts pure white or with a faint indication of reddish bars; under wing-coverts and axillaries white with narrow pale rufous bars; gray restricted to sides of head, none on the throat; all three birds have an indication of a rufous collar across the hind-neck.

ADULT FEMALE.—Exceedingly variable. One of the two birds is deep rufous and without bars underneath; not appreciably different from the female of *novae-guineae*. The other specimen is totally different. It is heavily barred underneath, much paler and less vinaceous, and conspicuously grayish. There is much gray on throat and breast, but even on abdomen and flanks the bars toward the bases of the feathers are almost pure gray. This specimen shows a certain approach toward the Australian race.

IMMATURE MALE.—Unknown to me.

IMMATURE FEMALE.—Rather similar to that of the "white" phase of *leucosomus*, lacking, like it, the rufous wash of the under parts, so conspicuous in the "rufous" phase, but differing by the much stronger brown barring. This is particularly conspicuous on the abdomen, under wing-coverts, feathers of the thighs, and under tail-coverts.

WHITE PHASE.—Unknown and probably absent.

Wing, ♂ ad., 218, 229, 232; ♀ ad., 271, 275; ♀ imm., 263, 265.

RANGE.—Fergusson and Goodenough Islands, D'Entrecasteaux Archipelago.

¹ w = white or *leucosomus* phase.

The paleness of the immatures is rather interesting because there seems to be no white phase in this species.

***Accipiter novaehollandiae*, subspecies**

The material from the Trobriand Islands, from Woodlark Island, and from East Island (Bonvouloir group) which is available at the present time is not sufficient for the subspecific allocation of these populations. From the three mentioned islands, only one single adult male is known (from Kiriwina Is., Trobriand Is.), and this has definitely not the characters of *pallidimas*. The general size is about intermediate between *leucosomus* and *pallidimas*, so far as can be told from the few specimens. The adult females are rather variable, but the four immature specimens, although rather similar among each other, are quite different from those of the other races.

No specimens in the white phase have ever been recorded from these islands.

ADULT MALE.—A single bird from Kiriwina Island fits well into a series of *leucosomus*, so far as the tone of rufous of the under parts is concerned. It is vaguely barred underneath and shows no gray on breast and throat; the axillaries are plain, but the under wing-coverts have an indication of barring.

ADULT FEMALE.—Woodlark Island. All three birds from this island have a rather deep rufous coloration of the under parts, a fact already mentioned by Hartert (1915, Novit. Zool., XXII, p. 54). Two birds are barred from the upper tail-coverts up to the throat, the third bird only up to the abdomen. One bird has considerable gray on the breast.

Of three adult females from Trobriand Islands

each is quite different from the other two. One bird has the under parts plain, the second one barred with white, the third bird has a grayish breast and abdomen and flanks barred with pale gray.

IMMATURES.—All four birds (3 ♂, 1 ♀) are strongly streaked and barred below, but with rufous brown on whitish ground. Under wing and thighs are pale rufous, about as in the "intermediate" of *leucosomus*.

More material must be collected on these islands before these populations can be definitely classified.

***Accipiter novaehollandiae misulae*,
new subspecies**

TYPE.—No. 532853, Amer. Mus. Nat. Hist. (Rothschild Collection); ♀ ad.; Misima Island, Louisiade Archipelago; August 21, 1897; A. S. Meek.

Differs from *leucosomus* and *pallidimas* by larger size and differences in the coloration, and from *leucosomus* by the absence of a white phase.

ADULT MALE.—Under parts dark as in *leucosomus* and not plain, but barred as in *pallidimas*; upper breast more or less washed with gray; greater under wing-coverts broadly barred with dark gray and only with a slight rufous tinge.

ADULT FEMALE.—Not clearly separable from the most strongly barred specimens of *leucosomus*, but averaging more coarsely barred and more grayish on the bars of the under parts and on the under wing-coverts; paler than the series from Woodlark Island.

IMMATURE MALE.—Very similar to the immature female of *pallidimas*; under parts white with heavy brown spotting and barring.

WHITE PHASE.—Apparently absent.

WING.—♂ ad., 237, 241; ♀ ad., 274, 281, 282, 284; ♂ imm., 236, 242.

RANGE.—Misima (St. Aignan) and Tagula (Sudest) Islands, Louisiade Archipelago.

NOTES ON OTHER SPECIES OF ACCIPITER

***Accipiter melanochlamys* (Salvadori)**

Only about 5 specimens of this rare species seem to be known outside of the series of 8 specimens in the American Museum. More fresh material from the Arfak Mountains is needed to determine the validity of *schistacinus* (see Mayr and Rand 1937, Bull. Amer. Mus. Nat. Hist., LXXIII, pp. 14–15). A completely immature bird of this species was up to the present time undescribed, but a partly immature bird was discussed by Ogilvie-Grant (1915, Ibis, Suppl., p. 259).

The Whitney South Sea Expedition (H. Hamlin) collected an immature male of this species at Fane (1300 m.), Yule Island district, southeastern New Guinea, which was erroneously listed as *Accipiter novae-hollandiae leucosomus* by Mayr and Rand (*op. cit.*, p. 15). Of the seven species of New Guinea *Accipiter*, the immature of four cannot be mistaken for *melanochlamys*; they are *poliocephalus*, with its very peculiar coloration, the large-sized *meyerianus* and *bürgersi*, and the small *cirrrocephalus* with its long middle toe.

From the immature *Acc. nov. leucosomus*, the immature *melanochlamys* differs by the blackish, not brownish, coloration of the upper parts, by the broad tawny rufous edges to the feathers of back, rump, scapulars, upper wing- and tail-coverts, and secondaries; by having a partly whitish, partly tawny collar across the hind-neck; by having the under parts whitish with bold oval or heart-shaped blackish spots; by having more black on the sides of the head and before the eye. Thighs, under tail-, and wing-coverts are less washed with rufous.

Differs from the immature *Accipiter fasciatus polycryptus* by the black, not rufous brown, markings of the under parts; by the much darker color of the upper parts; also by the yellow cere, and by having the second primary shorter than the sixth.

MEASUREMENTS (*melanochlamys*).—Wing, ♂ ad., 213, 223, 226; ♂ imm., 227; ♀ ad., 248, 248.5, 252, 256; tail, ♂ ad., 158, 160, 160; ♂ imm., 175; ♀ ad., (178), 185, 186, 195; tarsus, ♂ ad., 58, 62, 64; ♂ imm., 62; ♀ ad., 67, 67, 69, 72; middle toe (without claw), ♂ ad., 33, 34, 36; ♂ imm., 34; ♀ ad., 37, 38, 39, 42.

Proportions (in comparison with *A. novaehollandiae leucosomus* and *A. fasciatus polycryptus*):

	Tail × 100
	Wing
<i>melanochlamys</i> (ad.)	70.6–78.6 (73.8)
<i>melanochlamys</i> ♂ imm.	77.1
<i>leucosomus</i> ♂ imm.	73.1, 73.3, 76.1
<i>polycryptus</i> ♂ imm.	75.2, 79.6
	Tarsus × 100
	Wing
<i>melanochlamys</i> (ad.)	26.0–29.1 (27.5)
<i>melanochlamys</i> ♂ imm.	27.3
<i>leucosomus</i> ♂ imm.	27.2, 29.2, 29.5
<i>polycryptus</i> ♂ imm.	26.6, 28.0
	Middle Toe × 100
	Tarsus
<i>melanochlamys</i> (ad.)	53.2–58.6 (56.2)
<i>melanochlamys</i> ♂ imm.	54.8
<i>leucosomus</i> ♂ imm.	56.5, 58.6, 60.5
<i>polycryptus</i> ♂ imm.	52.5, 52.5

These figures show that *melanochlamys* does not differ conspicuously in its proportions from either *novaehollandiae* or *fasciatus*.

Accipiter cirrhocephalus rosselianus, new subspecies

TYPE.—No. 533932, Amer. Mus. Nat. Hist. (Rothschild Coll.); ♂ imm.; Mt. Rossel,

Rossel Is., Louisiade Archipelago; December 7, 1915; A. S. Meek.

Differs from *papuanus* by heavier markings of the under parts, the streaks and bars being brown, not rufous tawny; thighs rufous tawny, narrowly barred with whitish; under tail-coverts heavily barred with brown; upper parts blackish brown, all feathers with broad rufous edges; subterminal black bar of upper tail-coverts narrow, followed by a broad gray bar.

Similar to *cirrhocephalus* (Australia) but differing by the darker upper parts with broader rufous edges of the feathers, by the less heavily marked under parts and by the much more finely barred thigh feathers.

Wing, ♂ imm., 214, 219; tail, 159, 160.

RANGE.—Rossel Island, Louisiade Archipelago.

Although I have seen only two immature males of this form, I do not hesitate to describe them, because they are quite different from a considerable series of *Accipiter cirrhocephalus papuanus* from New Guinea and the western Papuan Islands.

The size of the two males agrees fairly well with that of females of *papuanus* from New Guinea. It is therefore possible that the two specimens are actually females. Against this possibility is the fact that the two specimens were collected at different times (one March 4, 1898, the other December 7, 1915) and that Meek's sexing is generally very reliable. Furthermore, races from the eastern Louisiades are often much larger than the corresponding New Guinea form (*Accipiter novaehollandiae misulae*), and the color characters of the new form are in the direction of the large Australian *cirrhocephalus*. At any rate, even if the sexing should turn out to be erroneous, the subspecies would stand on its color characters.

The measurements of a series of *Accipiter cirrhocephalus papuanus* may be useful for comparison:

Wing, 7 ♂ ad., 182–190 (185.7); 6 ♀ ad., 204–220 (211.2); 2 ♂ imm., 188, 190; 6 ♀ imm., 211–221 (216.5); tail, 7 ♂ ad., 128–133 (131.1); 6 ♀ ad., 142–156 (147.1); 2 ♂ imm., 132, 137; 6 ♀ imm., 151–156 (154.0).